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BURT VENTILATORS



*"A Size and a Type
for Every Condition"*

The Burt Manufacturing Co.
Akron, Ohio, U. S. A.

Manufacturers of
VENTILATORS
OIL FILTERS EXHAUST HEADS

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American Sheet and Tin Plate Co., Monessen, Pa.
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Atchison, Topeka and Santa Fe Railroad Co., Albuquerque, N. M.
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The Barber Asphalt Co., Buffalo, N. Y.
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Northern Power Company, Minneapolis, Minn.
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Oliver Chilled Plow Works, South Bend, Ind.
Pennsylvania Railroad Co., Philadelphia, Pa.
The Quaker Oats Co., Akron, Ohio.
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The Roessler & Hasslacher Chemical Co., Perth Amboy, N. J.
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The Sun Oil Company, Philadelphia, Pa.
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United States Government, Washington, D. C.
United States Steel Corporation, New York City.
Western Electric Company, New York City.
Westinghouse Electric & Manufacturing Co., Pittsburgh, Pa.
Westinghouse Lamp Works, Bloomfield, N. J.

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Plant of
The Burt Manufacturing Company
Akron, Ohio, U. S. A.

Bringing the great outdoors inside— Scientifically



BUILDING ventilation, as it is now practiced, has so thoroughly sold itself to architects and consulting engineers in the past few years that their major problem today is the selection of the proper type of ventilator to handle each installation.

Farmers, mail carriers, truck and taxi drivers and others with similar outside work have plenty of fresh air in which to labor. The true object of ventilation is to duplicate, as nearly as possible, these conditions for the workmen who occupy one room or one bench for hours at a time.

This can be done and to take the place of the conditions of the man moving around in the outside air, the air can be made to circulate around the man—with the added advantage that there will be no drafts or frosty winds to cause colds or discomfort.

The vitiated atmosphere, made up largely of foul air which has been inhaled and exhaled several times and fumes, dust or smoke given off by machines, causes all sorts of physical ills from drowsiness and headache to infections that cause colds and influenza. Tests show a definite relation between the efficiency of ventilation and the number of accidents and layoffs due to drowsiness and illness of the workmen.

Plant designers today include modern sanitary conditions as a matter of course—yet not so very long ago little thought was given to the increased efficiency that might be gained from installation of proper conveniences. Ventilation is

just now coming to occupy the same position in the minds of those responsible for working conditions.

Fresh air for ventilation is free; wind and temperature difference, the two major basic forces that operate in a ventilator, are to be found nearly everywhere. In the large majority of ventilator installations, the first cost of ventilators is the only charge for bringing the air into the plant and circulating it where it is needed. Only under severe conditions is the use of fans or blowers involved, as sufficient movement of the air can be provided in most buildings by placing a ventilating system for the escape of hot, vitiated air lying under the ceiling or roof.

Anyone can see that in an unventilated factory, while employees are fresh and alert in the morning, their vitality, both mental and physical, decreases a short while after the building is filled and the hum of work causes the air to warm up. A further feeling of warmth in the air takes place because it has been breathed in and out several times by the workers.

This fact is widely known as is proven by the many companies who provide for a rest period in the middle of the forenoon and of the afternoon. During these periods the employees must get out of doors or at least throw the window open so as to get the maximum amount of oxygen into their lungs and bring back their energy as quickly as possible.

While this ventilation works well, its effects last only a short time. With the windows thrown open the lower strata of vitiated air are replaced by fresh air and the vitiated air which has gravitated toward the ceiling remains. With the air practically stagnant, the lower levels

of the vitiated air come lower and lower until, in a very short time, the atmosphere around the workers is as bad as it was before the rest period. More accidents occur in poorly ventilated buildings, coming as a direct result of the loss of vitality and mental alertness brought about by the vitiated atmosphere.

THE HISTORY OF VENTILATION

Ventilation, now a science, with a majority of the people in the United States dependent upon its operation for their health and well-being, developed slowly as did the other sciences. Two thousand years ago there was no need whatever for ventilators because the majority of the people lived in a warm climate where doors and windows were open most of the time. Those few who lived in colder climates had a hole in the roof, above the fire which kept them warm.

This hole in the roof was the forerunner of our modern ventilators. The warm, light air from the fire rose through this hole taking out the majority of the smoke and creating a suction which constantly changed the air in the room. Furthermore, the houses were not tightly built and ventilation took care of itself through the chinks and the cracks.

Castles and cathedrals were the only buildings large enough to present any real problem in ventilation. Holes were cut in the roofs haphazardly to take care of this. In some, large ducts or areaways were built to lead up to these holes. Of course, the rain and sleet and snow

entered the building through these holes at every storm.

Hundreds of years passed with this being the only attempt made at ventilation. When factories came into existence in the latter part of the 19th century, many people were brought together in one room. Little thought was given to ventilation, the only object being to keep the outside weather from entering the building. With these conditions, ventilation almost disappeared and was not again brought to public attention until the foul, polluted atmosphere started plagues among the workers.

About 1875, people began to devise ways to get this foul air out through the roof. In most cases this was just a hole covered by a flat or conical piece of metal. This did not keep out the rain or sleet or snow when there was a wind blowing. In many cases the design of these covers hindered the ventilation and, at best, they did not work until temperature conditions were right. The air inside the room had to be warmer than that outside, before the vitiated air would move out the passage provided.

Further attempts to keep out the weather resulted in the installation of stormbands and louvers, most of which hampered the air passage until there was practically no ventilation.

Engineers, realizing the importance of ventilation to these rapidly growing factories, started to work and at the beginning of this century developed a scientific product. This ventilator acted not only when temperature conditions



Steel Company of Canada, Ltd., Montreal, Quebec, Canada.

A TYPE FOR EVERY CONDITION



Seiberling Rubber Co.,
Barberton, Ohio. Insert:
Fan ventilators exhausting
steam from interior of plant.

were right but took advantage of wind currents to suck out the foul air from the buildings.

THE BURT CONTRIBUTION TO VENTILATOR HISTORY

Burt engineers were among the first to realize the value of proper proportion and placing of the stormbands and louvers so the maximum of air would be exhausted and the interior of the plant would be protected from the weather. Burt engineers have developed the Burt line from the plain stationary ventilator through the rotary types up to the power driven unit for severe conditions. All these types are described in this catalog, along with their various uses.

After they developed an efficient ventilator, they found it necessary to install a damper to cut down the large volumes of air exhausted through their ventilators at times when only a part of the output was needed. These dampers, like the ventilators, progressed from the cruder

up to the better types, such as the Burt Sliding Sleeve Damper. It has many advantages over other types of dampers and is an exclusively patented Burt product.

So ventilators, at first either not thought of or considered too costly and later much misunderstood, have been developed to take advantage of natural forces and make them do a definite piece of work with a real "dollars and cents" value.

The selection of the proper type of ventilator is the only consideration left and this catalog, backed up by personal service from Burt ventilation experts, can help you with that.

Inasmuch as we have entered the 567th repeat order from the United States Steel Corporation, the 324th from the Standard Oil Company and the 165th from the United States Government, we are confident that we can take care of your ventilator needs as well.

B U R T V E N T I L A T O R S



Upper left: Queen City Printing Co., Charlotte, N. C. Upper right: Ohio Salt Co., Rittman, Ohio.
Center: Potomska Mills, New Bedford, Mass. Lower left: The Jones & Lamson Machine Co., Springfield, Vt. Lower right: The Yale & Towne Manufacturing Co., Stamford, Conn.

Industrial Building Ventilation

WHILE there are more phases of industrial building ventilation than there are types of industrial buildings, these phases fall logically into a few major groups. A study of these groups gives a comprehensive view of the whole subject.

In the first place, each industrial plant, regardless of its type, requires a complete analysis in order to determine what type of ventilators are needed and how many and what size of ventilators should be employed to bring the great outdoors inside—efficiently. One point to be remembered is that the same industrial building used for the manufacture of different articles presents entirely different angles when it comes to ventilation. Similarly, different plants used for the manufacture of the same article present different problems.

With this possible variance of conditions, it is easy to see that no one type of ventilator can ever be used efficiently in every installation. Burt engineers at first produced only the Metal and Glass Top Sliding Sleeve Damper Ventilator. However, they soon learned that no certain type of ventilator was a cure-all for every condition and they set out to find other means of handling the abnormal cases. This resulted in the present complete line of Burt Ventilators, so that Burt is now in a position to supply a *type for every condition*.

POWER PLANT VENTILATION

Nearly every large industrial plant finds it cheaper to produce its own power than to buy it and hence has a power plant of its own. This is one ventilation condition that is common to almost all manufacturers. The problems discussed here pertain to public utilities power houses, central converter and transformer stations as well as private industrial power houses as their needs are similar from a ventilation standpoint. The fact that power houses

generate a large volume of heat, which makes conditions almost unbearable in hot weather, is one of the causes for the severe conditions requiring ample ventilation.

That power houses do present these aggravated conditions which demand ample ventilation is a widely recognized fact, backed up by the opinions of nationally known power plant constructors such as Stone and Webster of Boston, J. G. White Engineering Corporation of New York, Austin Company of New York, Austin Company of Cleveland, and a great many others. We venture the assertion that not a power plant is designed or erected by experts such as these, that does not make adequate provision for ventilation with a large margin for emergency.

The Burt Ball Bearing Revolving Ventilator is usually specified for power plants that are sufficiently free from surrounding buildings so that winds from any direction will have free access to them. Burt Fan Ventilators should be installed directly over the points where conditions are worst.

The revolving ventilator was brought out after many years of painstaking research on power plant conditions. The type will be described in detail farther on in the book but we will say here that it is beyond a doubt the leader of revolving ventilators. It takes advantage not only of the wind currents passing over the top and around the sides, but of those which pass through it as well.

In some states, however, the building codes require a ventilator that will close automatically in case of fire. To meet this, Burt engineers have designed the Burt Fire Retarding Cone Damper Ventilator which has been approved time and again in various tests by the National Board of Fire Underwriters. A patented fusible link in the damper chain will release the damper when it comes to a certain temperature which is below even the boiling point of water. When

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Power Plant of Aurora, Elgin & Chicago Railroad Co., Batavia, Ill.

this link melts, the damper drops instantly, automatically closing the ventilator.

The inverted cone used in this for a damper has not only the fire retarding feature but it guides the air in its course out of the ventilator, making this one of the most efficient of the stationary types. There are many other reasons why this ventilator has found instant favor and they will be taken up later.

If the fire retarding feature is not an essential, either the Burt Metal or Glass Top Sliding Sleeve Damper Ventilators will do the work as well. As the name indicates, these ventilators have a sliding cylindrical sleeve for a damper which hugs closely the inside of the air shaft walls so that no part of the damper protrudes into this shaft to hinder the flow of the air. These ventilators also have a patented clip which permits the damper being set in any position without the necessity of tying the chain around a post or other part of the building where it would be in the way of cranes or other moving machinery. If a rectangular air shaft is used in these places the rectangular ventilators can be made to fit, if a base designed to these open-

ings to fit a round ventilator shaft is impractical or undesirable.

Central Transformer or Converter Stations present another problem difficult to solve but handled very well by Burt installations. Very high voltages are used in power houses of this type and it is, therefore, necessary to be sure that the ventilators are waterproof. Otherwise any condensate that might form would drop into the machinery or wires or moisten the insulators and cause serious damage. Regular Burt installations have precautions to prevent this but on ventilators for transformer stations extra measures are taken on the ventilators and bases just as safety devices are provided on the power plant machinery itself to handle an overload which may never occur.

If the ventilators in central transformer or converter stations can be placed so that they are not directly over any of the equipment, then any of the Burt types can be used. If the ventilators must be placed over the operating equipment, we strongly recommend the revolving type where they have free access to the wind and our Burt Metal or Glass Top Ventilators

A TYPE FOR EVERY CONDITION

where the wind will be obstructed. In both these types, the extra precaution of placing a drip pan directly under the ventilator opening is taken. In addition to this, we wish in every case possible, to furnish our own bases so as to be sure that our customers get the condensation gutter which all of the Burt bases contain.

PAPER MILL VENTILATION

Paper mills offer another severe ventilation condition. Because of the great humidity in the atmosphere, water will condense on all the machinery and run into places that should be guarded from it, if there is not a steady circulation of air. Furthermore, this circulation must be handled so there will be no drafts on the workmen who will be especially sensitive to colds in this humidity.

In the pulp grinding rooms, with all their steam and moisture, Burt Power Driven Fan Ventilators are essential. Over the other parts of the mill, the revolving type of ventilator has found instant favor where outside condition permitted free access of air from all directions.

If some of the buildings are shielded from certain winds so as to hinder the operation of a revolving ventilator, the glass top ventilator is the type to use, because it is practically impossible to get too much light in a paper mill. Of course, where the state building codes require it, the Burt Fire Retarding type of ventilator must be used.

METAL WORKING SHOPS

In foundries, blacksmith shops, plating mills, rolling mills, steel mills, and shops with work of a similar nature, ample ventilation is a requisite. In most mills of this kind, the jobs presenting the more aggravated conditions such as furnaces, pouring off pots, dipping vats, etc., are hooded. These hoods are all connected to a huge manifold at the roof line where all the fumes are dumped into Burt Fan Ventilators. To handle the ventilation of other operations which present conditions more nearly average, a large number of Burt ventilators of the revolving or stationary types should be placed at advantageous positions over the roof where they will do the most good. The location and number of fan ventilators and other ventilators for metal working plants can best be determined by Burt engineers or your building engineers.

We realize that a great many of the fumes given off from the various metal working machines are injurious to galvanized iron and will eat through it in a short time. Accordingly, Burt ventilators can be made from any of the following metals, all of which are carried in stock: Toncan Metal, American Ingot Iron, Copper, Leadclad Sheets, Aluminum and Monel Metal. We are equipped to handle any other metal impervious to acid fumes or the acid itself. If you outline what type of fumes the ventilators should handle, Burt engineers can specify the type of metal to use.



Androscoggin Pulp Co., S. Windham, Maine.



Buildings of Cerro de Pasco Copper Corporation at Oroya, Peru.

RAILROAD BUILDINGS

Varying but little from the buildings in the metal working classification above, the railroad shops, round houses, union stations or any other building where railroad equipment enters or is housed can be easily handled by the regular line of Burt Ventilators. The type of ventilator is not so important, any type that will give maximum efficiency being suitable. In most cases the maximum ventilation is required regardless of weather conditions, so dampers are not needed.

After using galvanized iron ventilators for a long time and finding them wholly inadequate, most of the railroads went to cast iron ventilators. This not only necessitated an extra heavy roof construction to hold the ventilators, but presented an abnormal cost.

Experimentation on this by Burt engineers showed that ventilators made of Monel Metal, Aluminum, or Leadclad Sheets would stand up as well or better than the cast iron types and would not be nearly so costly. Furthermore, they would not present the problem of extra

heavy roof construction, for the ordinary construction would hold them easily.

PETROLEUM PLANT VENTILATION

In the petroleum industry also, great quantities of fumes are given off, requiring ample ventilation to preserve proper working conditions. In buildings used in this industry the type of ventilator depends largely upon the owners' wishes and local conditions, but it is necessary to have a good ventilator scientifically designed to remove all fumes immediately after they are given off.

An expensive or extensive system of ventilation is not needed as the Burt Revolving Ventilators or the Metal or Glass Top stationary ventilators will operate well. This is another industry where Burt engineers have done extensive research.

SUGAR AND SALT WAREHOUSES

A peculiar condition is found in sugar and salt warehouses where the air circulation must be

A TYPE FOR EVERY CONDITION



U. S. Export & Chemical Co., Titus, Fla.

efficient or the product stored will crystallize or harden, lowering its commercial value. The main object from a ventilation standpoint, is to keep the air from becoming excessively moist and this is taken care of in an excellent manner by the Revolving or the Metal or Glass Top stationary ventilators.

SAW TOOTH AND MONITOR TYPE BUILDINGS

In line with industrial building ventilation is the consideration of the special problem found in a very common type of building used in almost all industries, the Saw Tooth and Monitor type of building. A great many firms write that they do not need ventilation on certain new buildings because they are being designed to follow these principles of construction. Burt engineers often convince them that they are wrong.

It is conceded that during part of the summer months their ventilation is all that could be desired when the wind is from the right direction but when the fall storms, the winter blizzards and the spring showers set in, the windows must be closed and the ventilation is often shut off

just when it is most needed. Again, in the summer months, even if the windows are open, the wind often comes from the direction toward which the windows are facing. The saw teeth catch the wind and throw it down into the building, forcing the rising, vitiated air back upon the workers, and stirring up the dust that has been lying around. Of course, the windows could be shut when the wind shifts like this, but then the ventilation is gone.

Leading architects and engineers in all sections of the country have come to recognize this as a proven fact and now specify monitor type buildings only for the advantage of giving more light, taking care of the ventilation in the usual manner with ventilators.

WEAVE SHED VENTILATION

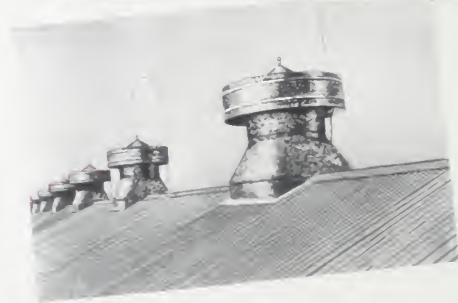
Weave sheds in textile mills, with their accurately controlled temperature and humidity, offer a difficult problem which Burt engineers have handled by the design of a special ventilator. The problem and its solution are discussed under the heading of "Double Damper Weave Shed Ventilators" on page 25.

B U R T V E N T I L A T O R S



Left: D. M. Ferry
Seed Co., Detroit, Mich.

Below: Roof detail of
Savona Mfg. Co., Char-
lotte, N. C.



Above: Roof detail of U. S. Export
& Chemical Co., Tikal, Fla.



Right: Roof detail
of American Clay-
Working Machinery
Co., Bucyrus, Ohio.



Public and Private Non-Industrial Building Ventilation

VENTILATION for public buildings is a positive asset and a necessity, although no such aggravated conditions are found here as in paper mills or power houses. The main object is to remove the air which has been inhaled and exhaled by the people occupying and visiting these buildings, to minimize the danger from contamination and disease. Even from the standpoint of comfort, ventilation in public buildings is an essential, as is realized by the many theaters and auditoriums which advertise that during hot weather the air is kept fresh and in constant circulation. Cooling and blower systems play their part in this, but it is generally the ventilators which carry off the foul air to make way for the fresh.

For the most part, the plans for public buildings such as schools, hospitals, libraries, city halls, court houses, auditoriums and the like, are prepared by city or state architects who are governed by their respective city or state building codes. All these types of buildings present practically the same problems so far as ventilation is concerned.

All these buildings demand a certain number of air changes per hour, depending upon the nature and size of the building and the probable number of occupants. Knowing these things, then, the architect can easily figure the volume of air that must be introduced into a room and exhausted from it during a given period.

SCHOOLS, AUDITORIUMS AND PUBLIC BUILDINGS

Most city and state laws, up to the present time, have specified that fresh air be blown into the building by a forced draft system of some kind. This is introduced into the various rooms near the ceiling line and taken out near the floor. The grilles or ducts that lead from the

rooms near the floor line are generally conveyed to large central ducts or airways on top of which are placed gravity type ventilators, usually of the stationary type. These ventilators are furnished without dampers so that a butterfly damper together with a thermostatic control can be furnished by the contractor.

Where the building to be equipped has only one story, as in a large auditorium, or where the most important rooms to be ventilated are located near the roof line, the ducts which convey the vitiated air can terminate in the sub-attic space. The ventilators on the roof line open directly into this space and exhaust the air from the building.

A separate duct to a ventilator on the roof is recommended for interior rooms which require ample ventilation such as gymnasiums, swimming pools or laboratories. A power driven fan ventilator is best for this, the power being turned on only when the room is occupied, the ventilator in itself being adequate when the room is vacant.

Several of the types of Burt ventilators serve well in most schools and public buildings, the Burt Metal Top Sliding Sleeve Damper Ventilator being the most commonly used. Where the ventilators will have free access to wind from all directions, the revolving type will exhaust the air efficiently. Some architects prefer to handle a proposition of this kind with as few ventilators as possible and empty all their room ducts into one or two quite large airways, rectangular in shape. For cases such as these, Burt engineers have designed the special rectangular types of ventilators. They are identical in their operation with the round types. These airways seldom have to be lit up but if they do, the Burt Glass Top Ventilators will take care of that without the installation of skylights.

B U R T V E N T I L A T O R S



Above: Hall-Fletcher High School, West Asheville, N. C. Oval: Vance School, Asheville, N. C.
C. Gadsden Sayre, Architect on both.

The Fire Retarding Cone Damper Ventilators can be used in public buildings where the building codes require protection of that sort or where the builder wishes that extra security. The Burt Fire Retarding Cone Damper Ventilator should be used by all means over ventilation outlets for motion picture projection booths.

In states where the law requires a positive ventilation for toilets and cloak rooms, it is generally possible to locate these rooms one above the other so the vitiated air from all of them can be brought into one vertical shaft

ending at the top in a Burt ventilator of any type the builder might think best.

Although we stated at the beginning of this chapter that ventilation problems on public buildings were quite similar, we do not mean that they can all be worked out by any rule of thumb method made to fit everything from one story schoolhouses to auditoriums capable of seating thousands of people. The difference between a ventilation system that works fairly well and one that handles the situation perfectly is almost always the difference between

A TYPE FOR EVERY CONDITION

one which has been figured out haphazardly and one that engineers have planned carefully from the ground up.

With this small difference there is absolutely no reason why anyone should have the installation that works fairly well, when Burt engineers are available at no cost and can give the benefit of their years of experience.

The work of these engineers goes even farther than aiding in the proper design of ventilation for a building about to be constructed—they are ready and willing to consult with anyone on improving unsatisfactory ventilation installations or on putting ventilators on a building which did not have them previously.

If workmen feel the effects of a lack of ventilation, how much sooner must school children feel drowsy and lose their desire for work? Many studies are none too interesting in the first place, and if the teacher is handicapped by poor ventilation, her work is doubled and tripled by the inattention and lack of interest on the part of the pupils. Furthermore, special care must also be taken to prevent drafts or the children will become ill and be absent from school. The problems of school ventilation are quite similar to those on public buildings in general, but each installation should have special study and planning.

To architects and others who feel that ventilators are so unsightly that they must not be placed where they can be seen from the front of the building, we might add that we often design special ventilators which cannot be seen from the street and which, at the same time, operate at the same high efficiency as our other models.

GARAGE VENTILATION

Quite often during the winter newspapers print accounts of men being overcome by carbon monoxide fumes while working in a garage with an engine running and the doors shut. This is entirely due to lack of ventilation.

While a ventilator placed on a small garage would not remove every bit of carbon dioxide fumes as soon as they are given off, it would carry them off through the roof fast enough to reduce the percentage of the gas in the air and make conditions comfortable. The majority of cases



Illinois Athletic Club, Chicago, Ill.
Oval: Detail showing installation of ventilators at bottom of areaway to ventilate interior rooms.

could be handled with a single small ventilator costing but a few dollars, the size of the ventilator to depend on the size of the garage.

RESIDENCE VENTILATION

Ventilation is necessary in a residence just as it is in a factory or public building. The fact that there are, as a general rule, fewer people in a residence does not affect the question of whether there should be ventilation or not—it merely allows those who are there to get along

with a simpler system of ventilation. One or two ventilators of a small size should take care of the average house properly.

In fact, the use of ventilators is almost the only way that many homes can get fresh air from the outdoors without causing a draft. Windows opened at the top or bottom to renew the air cause a draft; outside doors blocked open a few inches cause a draft; stairway doors opened to let the vitiated air rise into the second floor cause a draft; but a ventilator on the roof, with a pipe leading into the main part of the house, will draw the air out slowly and steadily while air to replace it will enter the house gradually through cracks, walls, etc.

In spite of these facts, most residences are not ventilated properly, but people are coming to see the value of this feature and it is growing rapidly. One factor that is probably the most influential in this growth is the fact that, with ventilators being made more efficient as the science progresses, smaller types can be used to handle the same job that once demanded larger ones. Burt engineers can place these ventilators so they will not be seen from the street line.

In the summer months, the top floors of most homes are absolutely dreaded. People will not work, read nor sleep there because of the sweltering heat. And in nine cases out of every ten, the top floor may be made just as habitable as the rest of the house by ventilation, although many home owners will not believe it until it is proven to them.

The equipment needed to virtually add another story to every home in the summer time is simple. A register or grille in the ceiling of the main room on the top floor will allow the overheated air to gravitate into the sub-attic space and a Burt stationary ventilator in the roof will allow this air to escape—and we know from experience that this will solve the great majority of cases.

Still, many homes are suffering torrid third floors during the summer months because ventilators are considered to mar the general outline and architectural beauty of the house. Burt engineers will agree that formerly this was the case in a great many instances but they have succeeded in a large measure in simplifying the lines of Burt ventilators and so constructing

them that they will harmonize with the general layout. The ventilating properties, however, have been given first consideration in this.

Inasmuch as utility is the basis of all art and most of the beautiful lines used in design and construction are the best for their use, Burt engineers have reasoned that utility should be considered first. Architects and engineers who are designing a home of comfort rather than a picture of wood and stone framed in trees will also place the proper handling of temperatures above any thought of the difficulty in working ventilators into the design of a home.

Interior rooms in large houses can be ventilated and lighted at the same time by a Burt Glass Top Stationary Ventilator.

FARM BUILDING VENTILATION

We have discussed ventilation problems concerning industrial buildings, public buildings, schools, homes and other buildings where human beings assemble. Since domestic animals have a respiratory system similar to ours and as vital to their life, it is necessary to see that they have ample fresh air. They are kept merely to work or produce, and their work or production depends on their health just as much as in the case of a human.

On farms depending primarily on cattle for income, proper ventilation of barns is absolutely necessary. In addition to keeping the animals in a healthy condition it is necessary to keep them at the highest point of productivity. In other words, if cattle are breathing the same vitiated air, possibly infected, over and over again, they cannot be expected to give as high a percentage of butter fat as they would under proper conditions.

With Burt rotary or stationary ventilators on the barns, the first cost is the last cost in caring for the ventilation. Animal heat is preserved by bringing ducts from the mouth of the ventilator to a point near the floor line.

Modern designs in poultry sheds make provision for the best of ventilation as a necessity in obtaining the maximum production of eggs and the maximum increase in weight. The smallest of Burt ventilators will take care of the foul air and insure the best of ventilation.

Burt Patented and Exclusive Features

HERE have been notable advances in the field of ventilation since it progressed from the "hole in the roof" stage. We are justly proud that some of these have come from the Burt laboratories and were designed by Burt engineers. These Burt features account largely for the popularity of Burt Ventilators.

SLIDING SLEEVE DAMPER

After developing a scientifically designed ventilator that would be storm-proof and would exhaust the maximum amount of air, Burt engineers had to develop a means of regulating this flow of air efficiently. After considerable experimentation, construction and development, Burt engineers decided that the Burt Sliding Sleeve Damper would handle this problem best because of the following advantages:

- 1—When partly closed, it does not throw the air back into the building.
- 2—There is no chance for dirt to accumulate on it when closed and fall back into the building when opened as in other types.
- 3—Wind currents do not affect its adjustment when it is partly closed.

As the name implies, the Sliding Sleeve Damper is a sliding sleeve of sheet metal which hugs closely the inside walls of the ventilator shaft. The rope or chain to regulate it is run over a pulley suspended inside the peak of the ventilator. At its uppermost position the damper completely closes the ventilator. When the rope is released it drops into a position which leaves the ventilator wide open and the maximum amount of air can be exhausted.

SPRING CLIP

The Spring Clip is a natural partner of the Sliding Sleeve Damper for it is the means that Burt engineers have developed to hold the damper rope in place after changing adjustments.

This clip consists of a piece of heavy coppered iron wire bent with a loop and a narrow neck. When the rope is being adjusted it slides freely up and down through the loop, but when the damper is to be set at a certain adjustment a sideward pull on the rope will squeeze it into the neck where it is held until it is intentionally dislodged to readjust the damper.

NOTCHED RIM

Burt engineers developed the patented notched rim for holding the glass in place on the glass top ventilators. It is simply a band of metal with a flange turned in on each side, the flanges being notched to allow for bending in a circle. When the glass is replaced with one of these notched rims in use, the operation involves only the glass and the band and requires only a few minutes.

CONDENSATION GUTTERS

Water will sometimes condense on the inside of the head and shaft of the ventilator and if

not properly handled, it will drip down into the building on anything that may be underneath—fabrics, generators, or delicate apparatus. Burt bases all have a condensation gutter running completely around their circumference to gather this water and carry it to a small hole in the base near the roof where it runs off.

OTHER FEATURES

These features are listed here to show the great strides taken by Burt engineers in developing the science of ventilation. By them ventilation is given a position where it acquires a positive dollars and cents value.

Burt ventilators have not only these features but many others, most of which are applicable to only one type of ventilator. They will be taken up and discussed under the various ventilators to which they apply.

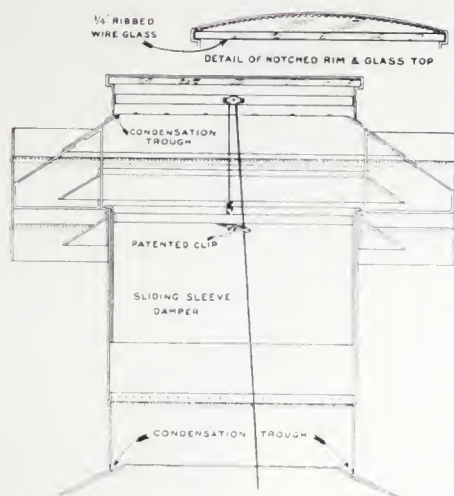


Diagram of Glass Top Ventilator on Base showing some Burt Patented and Exclusive Features.

Representative Public Buildings of

Burt engineers, in carrying out their slogan of "A Type for Every Condition," have answered requests from all parts of the world to provide proper ventilation. Firms and organizations of every size, from the largest such as the United States Steel Corporation, the Standard Oil Company, and the United States Government down to the smallest have sought the expert advice of these engineers in solving especially difficult problems in bringing fresh air where it is needed.

No single type of building, classified either as



Upper left: Hotel Portage, Akron, Ohio, Essenwein & Johnson of Buffalo, Architects. Left center: Administration Building, Charlotte, N. C., Charles C. Hook, Architect. Right center: Fire Department, Welfare Department and Police Department Buildings, Charlotte, N. C., Charles C. Hook, Architect. Upper right: Municipal Building, Akron, Ohio, Good & Wagner, Architects.

Which Burt Ventilators Are Used

to use or construction, has been missed by Burt engineers in their surveys; their experience includes ventilation of buildings from capitol buildings to chicken houses, from power plants and weave sheds to public auditoriums. With the knowledge gained from this experience at first hand, every builder of any kind of a structure can call upon them with the assurance of getting reliable information.

The buildings shown on this page have been equipped with the aid of Burt engineers, most of them recently.



Texts: Lower left: Keith-Albee Palace Theater, Akron, Ohio, George Rapp & Co. of Chicago, Architects. Lower left center: Arkansas State Capitol, Little Rock, Ark. Lower right center: Redford High School, Redford, Mich., Verner, Wilhelm & Molby, Architects. Lower right: Hutton School, Detroit, Mich., McGrath, Dohman & Page, Architects.



(See tables of Dimensions and Weights, Pages 37 and 38)

Metal and Glass Top Sliding Sleeve Damper Ventilators

Features:

- 1—Air shaft unobstructed.
- 2—Sliding Sleeve Damper (See Page 19).
- 3—Spring Clip to hold damper chain (See Page 19).
- 4—Ample outlet for all vitiated air.
- 5—Glass Top Ventilator serves also as skylight (See Cut, Page 23).
- 6—Glass Top Ventilator has Burt Patented Notched Rim (See Page 19).
- 7—Glass Top Ventilator has Condensation Gutter (See Page 19).

Metal and Glass Top Sliding Sleeve Damper Ventilators

THE Burt Metal and Glass Top Sliding Sleeve Damper Ventilators were both pioneers in the Burt line. They were designed so well that, with only a few changes, they are competing successfully with all other ventilators which have been designed since.

When designing this ventilator, Burt engineers considered the following points, all essential to a good ventilator:

- 1—That it be absolutely weatherproof.
- 2—That it be designed to exhaust the maximum amount of vitiated air.
- 3—The wind bands, as well as the other exposed parts of the ventilator must so harness the winds that they will create a greater suction or draft than an open pipe.
- 4—After getting a scientifically designed ventilator that would exhaust a maximum amount of air, that would be absolutely stormproof, and that would be so rigidly constructed as to last as long as the best roofs, Burt engineers used the Sliding Sleeve Damper to regulate ventilation to desired amounts, because it would not impair the efficiency of their ventilators.
- 5—The patented clip as the best means of holding the proper adjustment on the damper, and to obviate the necessity of tying to a post or other obstruction in the building.

The ventilator, just as it is described above, gives all that anyone can want in ventilation under normal conditions.

GLASS TOP VENTILATOR

More light can be used in almost any shop or room. Builders realize this and are constantly taking up more and more of the outside wall space with windows.

With Burt Glass Top Sliding Sleeve Damper

Ventilators the ventilation problem and the lighting problem can both be solved at a stroke. The quality of the ventilation is not affected a bit by this change from a metal top to a glass top and daylight, better for working purposes than artificial light, is brought into the room from above, saving a regular monthly electricity charge for the artificial lights which it replaces.

Very often interior closets are utterly worthless because they are dark and damp and have no means of ventilation. A single glass top ventilator turns this into a room which can be used for mailing, filing, or other purpose which can be fitted into that space. Overhead is absolutely cut down by this ventilator, because these



Lighting afforded by Glass Top Ventilator. Light is absolutely unimpeded by Sliding Sleeve Damper.

otherwise uninhabitable rooms can be used where they were formerly a fixed capital investment with no income.

It is in connection with the glass top ventilator that the sliding sleeve damper is even more valuable than in the metal top. It can be seen that with the sliding sleeve damper, nothing projects into the air shaft to cut down the steady stream of light that pours through the glass top. In the same manner, the sliding sleeve damper offers no obstruction whatever to the free flow of air in its progress through the stack to the head of the ventilator.

The patented Spring Clip is used in both the Metal and the Glass Top ventilators to hold the damper control rope in any desired position, either entirely closed, open or at midway points. Other features which have contributed to the wide acceptance of this ventilator are the Notched Rim for holding the glass in place, making for easy installation or replacement if damaged—all without touching any other part of the ventilator—and Condensation Gutter for conducting any condensate which might form to outside of building.

METAL TOP VENTILATOR

In making the metal top ventilator, it is necessary to cap the head with a cone. This cone is designed scientifically and not haphazardly thrown together. Points considered in this one item alone were appearance, strength, durability, ventilating action, and the proper slope to shed water and snow.

A definite durability was built into these ventilators, as well as all others of the Burt line. Farther back in this book is given a schedule of dimensions and gauges of iron used on Burt ventilators. It can be seen on comparison of Burt ventilators with others, that Burts are made from four to six gauges heavier than is used in most instances for the specific size of competing ventilator. With this heavier construction throughout, there is absolutely no need for making the bases of metal two gauges heavier than the ventilator head as many ventilators are built, the heavier construction throughout being sufficient to handle any stresses or strains that might be placed on the ventilators.

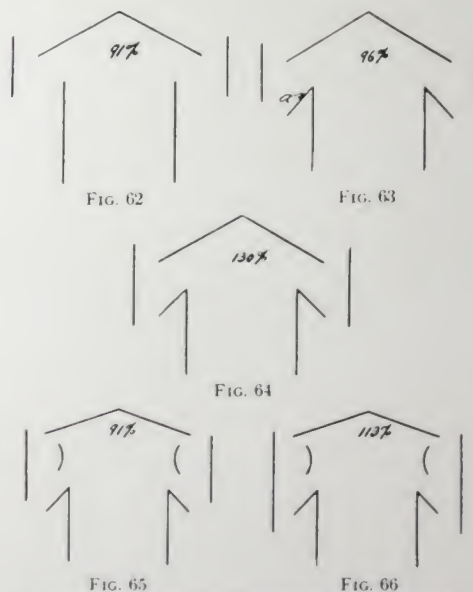
In handling certain unusual conditions special metal can be used and the following are carried

in stock: Toncan Metal, Ingot Iron, Copper, Aluminum, Monel Metal, Leadclad Sheets, and Keystone Copper Bearing Steel.

VERDICT OF AUTHORITY

In a discussion of ventilator design in the American Society of Heating and Ventilating Engineers' Guide for 1923, the efficient placing of wind bands and louvers and other parts of the ventilator head was discussed. The cross-sectional drawing representing the Burt ventilator (unlabeled in the guide, but of exactly the same proportions as the Burt stationary ventilator) had the highest efficiency of any. The air exhausted by an open stack was taken as 100% and this ventilator was shown to have an efficiency of 130%.

The Burt Manufacturing Company will positively guarantee this ventilator, size for size and type for type, to have an exhaustive capacity equal to or greater than any other ventilator on the market. This guarantee is backed up by the record of 35 years of business by the Burt Manufacturing Company.



EFFICIENCIES OF VARIOUS STYLES OF VENTILATORS

Middle Sketch shows exact proportions of Burt Metal Top Sliding Sleeve Damper Ventilator. Note higher efficiency for this type. (Reprinted from American Society of Heating & Ventilating Engineers' Guide Book of 1923.)

A TYPE FOR EVERY CONDITION



(See tables of Dimensions and Weights, Pages 37 and 38)

Double Damper Weave Shed Ventilator

AMONG the severe conditions encountered in handling industrial ventilations are the peculiar ones found in weave sheds. The temperature is most carefully handled and humidity is introduced into the air to aid in working the threads. Also, condensed moisture would ruin the fabrics if it were to drop on them. After a special research on these conditions, Burt engineers found as the main problem that with the extra humidity introduced into the atmosphere, condensation of water on the ventilator which exhausted the air from the sheds was particularly difficult to handle.

Regular Burt ventilators handle condensation with their condensation gutter, but it was thought best to introduce safety devices to prevent any possible chance of moisture dropping down into the work, just as structures are built

with an extra allowance for stresses that may never come and electrical installations have protective devices to handle surges that may never occur.

The Burt Sliding Sleeve Damper Ventilator with all its exclusive and patented features is used as the starting point in the building of this special equipment. To this is added a secondary damper hinged to the bottom of the ventilator shaft and operated by a rod fastening it to the sliding sleeve damper as a precaution against condensation dropping down on the fabric and ruining it. This is generally built in the form of a drip pan, with flanges turned up on the sides to catch any water that may fall. As a third

precaution, a stationary drip pan, somewhat larger than the base of the ventilator is furnished with the majority of orders for these installations.

This third precaution is necessary only when both dampers are closed to retain the heat as during cold weather. In addition to the condensation gutter that is regular equipment with Burt bases, another condensation gutter or drain is often placed around the air shaft below the roof line.

This ventilator, perhaps more than any other, shows to what lengths Burt engineers have gone in their work to provide "A Type for Every Condition." Although conditions do not often demand that this type of ventilator be made in special metals to resist the action of highly corrosive fumes, they can nevertheless be furnished in any of the following metals, all of which are carried in stock: Toncan Metal, Ingot Iron, Copper, Aluminum, Monel Metal, Keystone Copper Bearing Steel, and Leadclad Sheets.



(See tables of Dimensions and Weights, Pages 37 and 38)


(Above) Suggested method of fastening
spring clip to use fire retarding feature

Fire Retarding Cone Damper Ventilator

Features:

- 1—Approved by American Association of Fire Underwriters.
- 2—Fusible Link automatically closes damper at extremely high temperature.
- 3—High efficiency inverted cone damper.
- 4—Spring Clip to hold damper chain (See Page 19).
- 5—Extra wide wind band to give greater exhaustive power.
- 6—Three way suspension for cone damper insuring free action.
- 7—Ample path for all vitiated air.

Fire Retarding Cone Damper Ventilator

 HIS ventilator and its fire retarding feature make it the leader among metal top ventilators as the Sliding Sleeve Damper model is in the glass top ventilator field. Burt engineers brought it up to its present high efficiency within the past few months.

In many states and cities a fire retarding ventilator is required by the respective building codes. Specifications call for a ventilator which will close automatically when a certain temperature is reached. The automatic action is obtained in Burt Fire Retarding Cone Damper Ventilators by the melting at 160 degrees Fahrenheit of a fusible link (approved by underwriters) in the damper chain which allows the damper to drop into place and shuts off all air flow through the ventilator. The action and operation of this ventilator have been thoroughly approved by the National Board of Fire Underwriters. Furthermore, the Bureau of Standards at Washington, D. C., as well as educational institutions with facilities for testing ventilators, has given its approval to types similar to Burt Cone Damper Ventilators as one of the most efficient now on the market.

The first point that Burt engineers considered in developing this ventilator was that there should be no obstructions whatever in the air shafting or maximum efficiency would be lost. The only braces in the air shaft are three pieces of heavy galvanized strap iron running vertically along the sides and used as damper guides. Any interference to air flow caused by these would be so small it could not be measured.

The damper is an inverted cone which slides up and down on the three guides, being supported by a three way suspension on top fastened to the damper chain. The damper chain rolls over a rust resisting pulley attached to the finial on the top cone.

To those not thoroughly acquainted with the science of ventilation, it would seem that a flat, round disc would serve just as well for a damper. Burt engineers, however, found that it was decid-

edly better to use the cone construction, because the peak of the cone projecting downward into the air shaft would tend to guide the air outward and prevent any eddy currents that would decrease the efficiency.

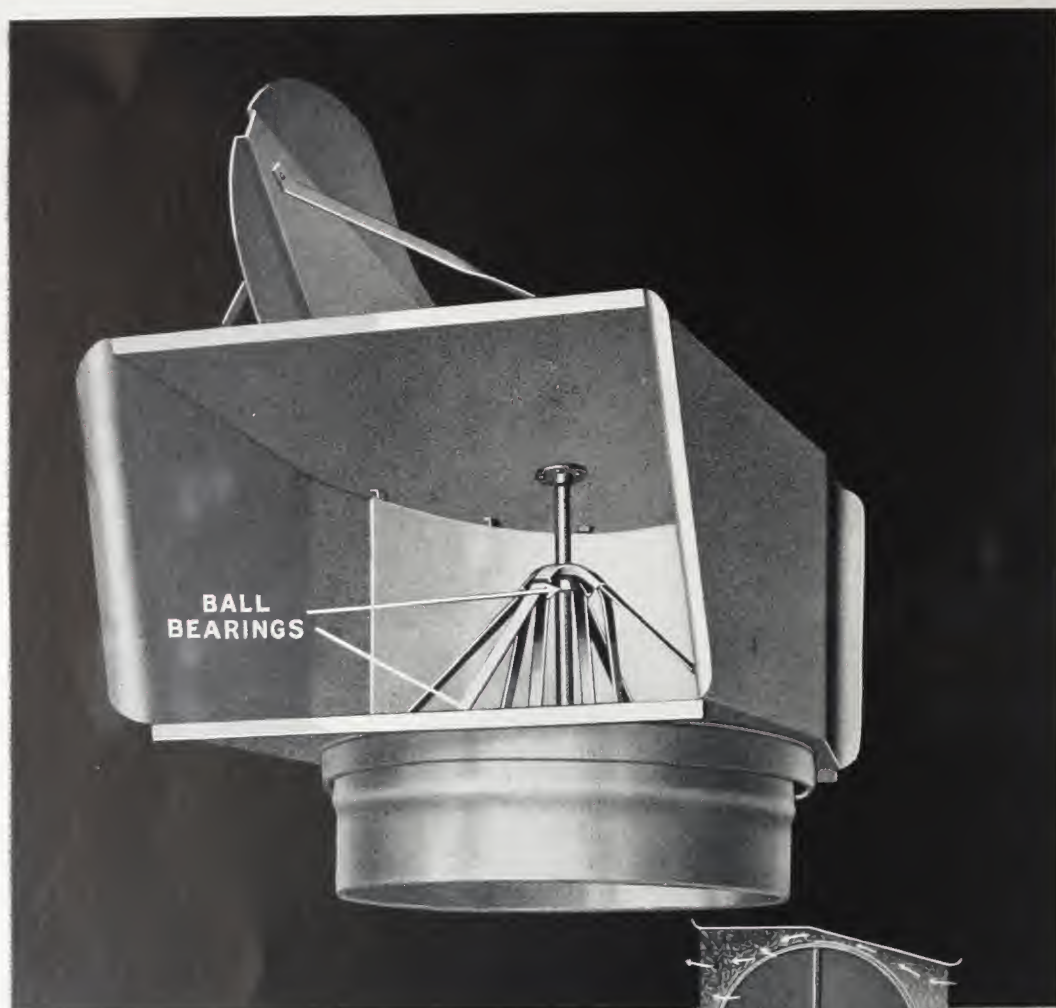
With the air thus guided to the louvers, Burt engineers had to develop an equally efficient method of handling it from there on. Outside the louvers there is only the wind band with its double function. It keeps the ventilator storm-proof and creates a suction on the leeward side to draw the air out of the head of the ventilator. Certain factors in the inside construction of this ventilator permit the use of an extra wide wind band and advantage is taken of this to secure the extra vacuum thereby obtained.

When the fire retarding feature is desired, the fusible link is inserted in the damper chain and the patented Spring Clip that is furnished should be placed in the air shafting below the ventilator or down below in the room. If the fire retarding feature is not desired the patented clip is bolted to the cone damper itself.

If the points of superiority of the sliding sleeve damper are reviewed, it will be seen that this cone damper has all of them while it is of fundamentally different design.

This Fire Retarding Cone Damper Ventilator embodies all the essential features found in the other designs. The body is made of prime open hearth sheets galvanized to make them resist rust. It is rigidly braced with galvanized bands, angles and channels, reinforced at the top with the characteristic Burt finial, and the damper is operated by rust resisting chain running over a rust resisting pulley hanging from the finial inside the top cone. All seams are riveted and swedged, not only for rigidity, but to give the ventilator a good appearance.

To meet special conditions, metals other than galvanized iron can be used. The following are carried in stock: Toncan Metal, Ingot Iron, Copper, Aluminum, Monel Metal, Keystone Copper Bearing Steel and Leadclad Sheets.

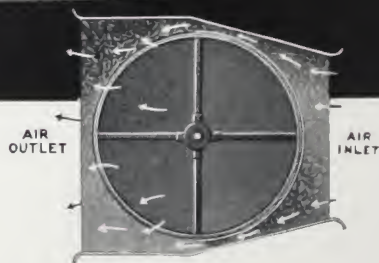


(See tables of Dimensions and Weights, Pages 37 and 38)

Burt Ball Bearing Revolving Ventilators

Features:

- 1—Free swinging on two sets of ball or Timken Roller bearings, cannot stick or bind.
- 2—Open back construction steadies ventilator in strong wind and increases its pulling power.
- 3—Ample outlet for all air in ventilator head.
- 4—Funnel action giving greater exhaustive power.
- 5—Flaring outlet giving greater exhaustive power.
- 6—Minimum obstruction in air passages.
- 7—Fully erected and tested before shipment.



Ball Bearing Revolving Ventilators

TO put the wind to work in the most efficient manner and make the air passing outside the building renew the air inside, a Burt Revolving Ventilator should be used. This type of ventilator can swing around to meet the wind from any direction and handle the air more efficiently.

A careful examination of the design of a Burt Revolving Ventilator reveals the care taken to make it storm-proof. The opening of the stack is to the leeward side and the vane on top of the ventilator always keeps it headed in the proper direction even in a weak wind, so the ventilator is absolutely storm-proof.

As a further point in making the wind work to ventilate a building, a view from the top of the inside construction will show a funnel on each side of the air shaft. This speeds the wind up as it passes the edge of the back a few inches further on and exerts a greater pulling force or siphoning action than if it were blowing past there normally.

Bear constantly in mind also that the opening on the leeward side of the head is greater than both the cross-section of the stack and the openings in the back so all the air that can possibly come into the ventilator head through these two sources, and more too, can be exhausted easily.

Weather vanes alone on a revolving ventilator are capable of heading it in the proper direction with an ordinary wind, which is from five to fifteen miles per hour. When they meet winds of high velocity or those full of eddy or cross currents, the weather vane itself is not capable of steadying the head of the ventilator so it can work efficiently. The head may even start whirling which is extremely bad. The Burt open back construction avoids this condition, providing an extra safeguard here, just as Burt has provided extra safeguards to handle other possible cases. The winds entering the open back and passing through the ventilator head tend to steady it and hold it with the wind—with the open back construction the vane on top is aided by the two sides which also act as vanes to keep the open face of the ventilator away from the wind as it should be.

The flaring outlet on the leeward side of the ventilator head is known to add to the exhaustive power of a ventilator by throwing the wind passing along the outside of the head away from that coming from the inside and causing a vacuum which the inside air will rush to fill up.

The operation of a revolving ventilator may seem complex but a careful rereading of the points above mentioned should clear up any question. The fundamentals themselves are those which operate a stationary ventilator but a revolving ventilator is a bit more intricate so it can put these fundamentals to better use.

SUPPORTS

Working on the same principles and keeping in mind that too much bracing inside the ventilator head will reduce the efficiency of the ventilator, Burt engineers have used the fundamentals of construction to design braces which have plenty of strength yet obstruct the air passageways as little as possible.

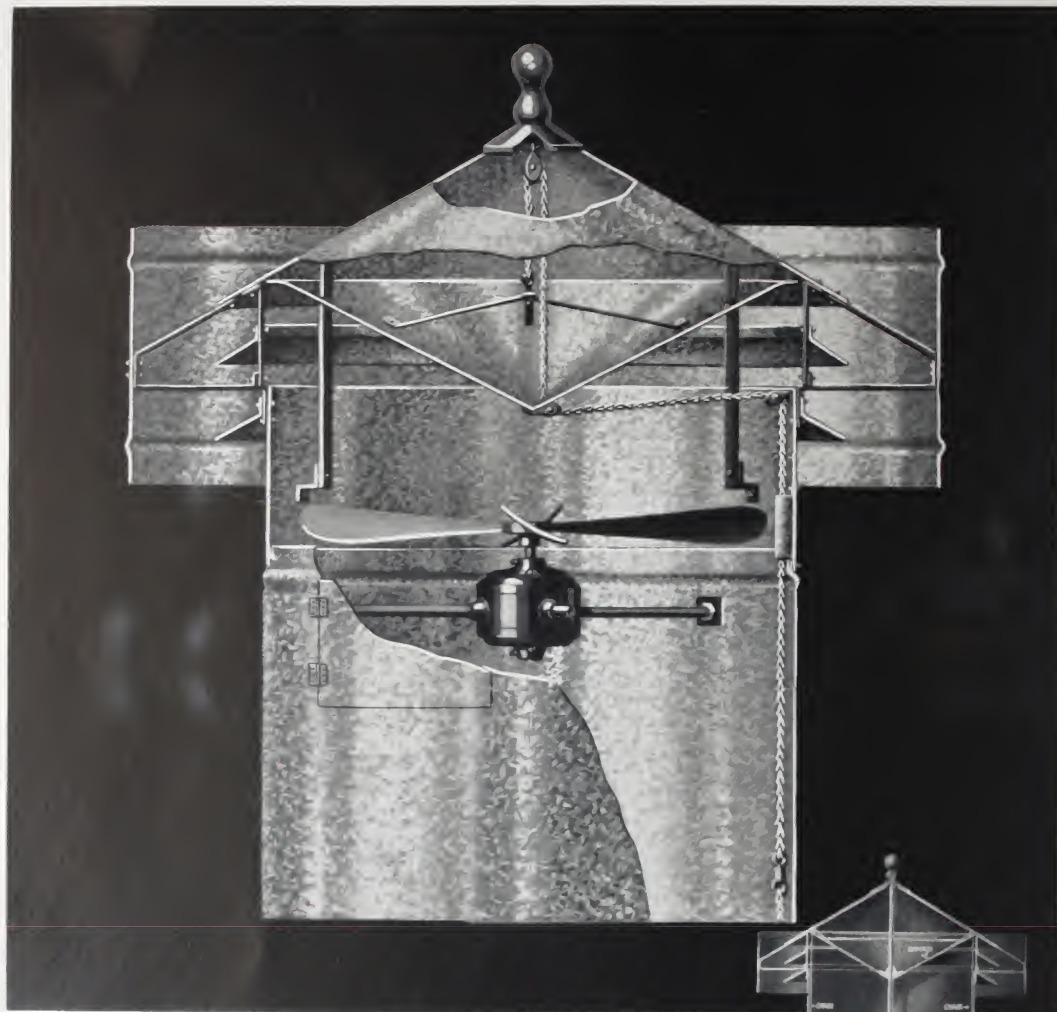
Burt Revolving Ventilators are pivoted on their center of gravity so the only lateral stress on the center tubing is that caused by the force of the wind. The center tubing will stand any such forces easily.

Two sets of ball bearings are used in each of these ventilators, one part way up the center shaft which carries the weight of the ventilator head and one at the bottom into which the bottom part of the center shaft slides and which keeps it always in a vertical position. This bottom bearing facilitates rotation and prevents friction. A piece of tubing is used on the larger sizes as the center support rather than a rod because of its greater strength and to eliminate needless weight.

Any kind of bearings can be furnished on specification, but the regular construction employs steel balls in steel houses because Burt engineers are convinced that they will give the best service. They are made of the same steel as is used in automobile bearings so they will stand severe strain.

Bronze bearings are carried in stock to put on the ventilators for architects and engineers who specify them. We do not guarantee bronze bearings, however. With standard Burt construction, the rim of the ventilator head runs free around the base and will not jam, even in excessively strong winds.

To meet special conditions, metals other than galvanized iron can be used. The following are carried in stock: Toncan Metal, Ingot Iron, Copper, Aluminum, Monel Metal, Keystone Copper Bearing Steel and Leadclad Sheets.



(See tables of Dimensions and Weights, Pages 37 and 38)

Burt Fan Ventilators

Features:

- 1—Six times greater exhaustive power than other types.
- 2—Quietness of operation.
- 3—Inverted cone damper.
- 4—Retards fire just as does the Fire Retarding Ventilator.
- 5—With power off, normal ventilation continues.
- 6—Low power consumption.
- 7—Fan ventilators are the only practical type for severe conditions.
- 8—Motor fully enclosed, dust and moisture proof.

Burt Fan Ventilators

FOR many of the severe conditions discussed in the chapter on industrial building ventilation, the Burt Fan Ventilator is the only type capable of quickly and efficiently exhausting the vitiated air. Like all other Burt Ventilators, it was developed by Burt engineers because there was no type on the market to fill this need.

Burt stationary and revolving ventilators are of as high efficiency as can be obtained from these devices but the power driven fan ventilators will exhaust approximately six times as much air and therefore are most effective for aggravated conditions which demand exhaustive capacities in these amounts. Their economy of installation and maintenance is bound to save large users thousands of dollars. This economy is obtained not only through installation of fewer ventilators, which do considerably more work, but through the medium of being able to use a lighter roof construction on account of a greatly reduced load effected by the saving in number of ventilators installed for a certain job. This reduction in number also adds greatly to the appearance of the building as it reduces the number of ventilators by approximately 85 per cent, consequently eliminating the unsightly appearance of so many stacks on the roof.

Blower systems and forced draft systems have been recognized for a long time by leading architects and engineers as an essential adjunct to any building program, but many of the conditions now handled in this manner could be worked more efficiently and cheaply with fan ventilators. Many of the present power driven units today operate horizontally from open penthouses on the roof and when the power is shut off, absolutely no air is exhausted. With a Burt Fan Ventilator, the power is turned on only when conditions are most severe and the vitiated air is quickly removed. When conditions return to normal or when work has ceased, the power is shut off and the ventilator functions just as an ordinary ventilator would in handling the less severe conditions.

GENERAL CONSTRUCTION FEATURES

The design of the head or hood of the Burt Direct Connected Fan Ventilator involves practically the same principles as those described under the Burt High Efficiency Fire Retarding Cone Damper. This construction was found most suitable for quickly and efficiently removing a large volume of air without

creating back pressure or adverse air currents. A few changes were necessary in the regular construction to meet Fan requirements; namely, the spaces between the louvres were increased, the wind band was enlarged, and the angle of the inverted cone was corrected to permit an easy outward passage for the increased velocity of the air. Outside of these changes, the ventilator head is practically identical with that of the cone damper, and when the motor is shut down the equipment can be used as a gravity ventilator, and has all of the advantages of that type.

That portion of the ventilator which supports the motor and fan mechanism is known as the fan barrel. This is fitted between the ventilator head and the ventilator base and is of a very rigid construction so that it will carry the weight of the motor as well as the downward thrust of the fan.

In addition, flexible composition vibration absorbers are clamped into the side of the barrel in such a way that there is no contact between the motor supports and the sheet metal air shaft. This method of construction absolutely absorbs all vibration and does away with objectionable noises. The motor supports are heavy hydraulic pipe, and are fitted directly into the specially designed motor frame giving a unit which is absolutely rigid throughout. (Note: Further details on the motor construction can be found under "Motor Features")

Burt Gravity Type Ventilators are often sold without base equipment, but on the fan type we prefer to furnish this so as to insure a rigid construction (using the same heavy gauge of iron as the ventilator) and at the same time, build into it Burt Patented Features such as condensation arrester, etc. The only exception is where the fan ventilators are to replace ventilators already installed or placed on stacks already erected, under which conditions they are furnished without the base; but with the understanding that all responsibility for vibration and defects at that point must be assumed by the purchaser.

MOTOR FEATURES

The power units employed in Burt Fan Ventilators are specially designed, fully enclosed motors capable of operating in the vertical position. Standard motors carried in stock are made by the Emerson Electric Manufacturers Company of St. Louis, but motors to our specifications can be obtained on order from the General Electric Company, or other motor

B U R T V E N T I L A T O R S

manufacturers in their standard frames if specified.

FRAME

The motor frames are cast to our specifications with three lugs in the sides at angles of 120 degrees, opening directly into the armature and windings. The frames are shaped so as to offer a minimum resistance to the passage of the exhausted air through the barrel of the ventilator. As stated above, they are dust proof and moisture proof, and being fitted with conduit boxes, can be successfully operated in steam, fumes, grit or vapors without harm to the motor windings.

WINDINGS

The single phase motors are of the split phase type, provided with two separate windings; namely, the main and the starting windings. The polyphase motors are of the pure induction type, the windings consisting of separate circuits varying according to the number of phases of the motor.

OPERATING TEMPERATURES

Under normal conditions our motors are designed to operate in temperatures of from 115 to 120 degrees Fahrenheit, in absolute safety. However, motors are available with specially ventilated covers which permit them to operate in temperatures of from 140 to 145 degrees Fahrenheit without any detrimental effects to motor. This feature is desirable in power plants, motor rooms, steel mills, and other places where high temperatures are encountered. The motors themselves are guaranteed to operate continuously under their rated load with a temperature rise of less than 40 degrees Centigrade.

LUBRICATION

The motors are fitted with compression grease cups which, according to the motor manufacturers' guarantee, need only be turned down about once a year. However, we recommend that they be turned down at least two or three times a year if possible. This can easily be done because the fan barrel is fitted with a large door which permits easy access to the motor.

When the motors leave the factory, the bearings are securely packed with Lubrico grease which is the grade recommended by the motor manufacturers. If this is not obtainable, they suggest a good grade of No. 3 cup grease. As the bearings come to the manufacturer in dust proof and moisture proof wrappers which are not opened until they are ready to be placed in the motor frame, it is essential, if they are to remain in good condition, that these recommendations with reference to grease be carried out.

SPEED CONTROLS

Speed controls are not available for motors of the ordinary split phase and induction types such as are standard with us, but they can be furnished on special installations where specified. However, this involves the ordering of capacitor type motors. We do not recommend or believe speed controls are essential or desirable on the larger sized fans. Direct Current Motors can, of course, be equipped with rheostat controls as furnished by the Cutler Hammer Company, Allen & Bradley or other manufacturers of such devices. These controls generally are designed for high speed 75 per cent and 50 per cent high.

OPERATING COSTS

An idea of the low cost of operating these fans can be obtained by using the 24 inch size as an example. This motor when operating at full load and delivering 4100 cubic feet per minute, consumes approximately 200 watts, which at a cost of 5 cents per kilowatt, amounts to only 1 cent per hour operating cost. This instance proves that the cost of operation is negligible compared to the results obtained.

Belt Driven Fan Ventilators

This type fan ventilator which is driven from line shafting or from individual motors is available in four types and is recommended only when a large number of ventilators can be used in a straight line, or where power costs are extremely high. Full details with reference to the various types will be sent upon request.

GENERAL DATA

VENT SIZE †	MOTOR H. P.	MOTOR R. P. M.	WATTS CONSUMED	CAPACITY C. F. M.
14"	1/10	1750	92	1400
16"	1/10	1750	110	1550
18"	1/10	1750	130	2000
20"	1/6	1140	138	2550
24"	1/6	1140	200	4100
	1/6*	850	225	3375
	1/10*	670	180	2850
30"	1/4	850	300	8000
	1/6*	685	200	6400
36"	1/4	850	400	10000
	1/6*	685	260	7600
40"	3/4	685	690	11750
42"	3/4	685	710	12400
48"	3/4	685	800	13800

GENERAL INFORMATION

Motors are available in practically any electrical characteristics A. C. or D. C., except single phase on sizes requiring $\frac{3}{4}$ H. P. Standard motors in stock at Akron for immediate shipment are listed below. Motors to other characteristics can be furnished within three weeks.

1/10 hp 110v	60cy	1ph	1750 r. p. m.
1/10 hp 220v	60cy	1ph	1750 r. p. m.
1/6 hp 110v	60cy	1ph	1140 r. p. m.
1/6 hp 220v	60cy	1ph	1140 r. p. m.
1/6 hp 220v	60cy	3ph	1140 r. p. m.
1/4 hp 110v	60cy	1ph	850 r. p. m.
1/4 hp 220v	60cy	1ph	850 r. p. m.
1/4 hp 220v	60cy	3ph	850 r. p. m.
3/4 hp 220v	60cy	3ph	685 r. p. m.

See table at left for hp. required on various sizes.

*Slow speed motors must be used on copper, aluminum or ventilators made from light materials. Also used in theatres, etc., where air movement must be at a low velocity or where slight noise is objectionable. Furnished only when specified or under conditions named above.

†12" size can be furnished to same characteristics and price as 14" capacity is 1200 c. f. m. 54" and larger can be furnished to special specifications.

In ordering be sure to give electrical characteristics and complete base information; pitch, ridge or slope, etc. Price includes round base; square bases extra. If fans are to operate in temperatures of more than 125° F. and less than 150° F. specify motors with self ventilated covers.



(See tables of Dimensions and Weights, Pages 37 and 38)

Rectangular Ventilators

AS the name implies, these ventilators are built rectangular, as opposed to the common round type of ventilator. Their major use is found where air shafts are emptied into a large rectangular pipe and the rectangular ventilator is built to fit. On old buildings, there are often ventilator pipes of rectangular cross-section rising to the roof and these are perhaps best taken care of in an economical manner with ventilators made to fit.

As a combination skylight and ventilator, the rectangular glass top models are as thoroughly efficient as the round glass top models. The sliding sleeve damper is used in the square models as well as in the round. If there is a skylight already in a room and it is felt that ventilation is needed, both can be obtained without using any more roof space if a Burt rectangular glass top

ventilator is made to fit the skylight hole already in the roof.

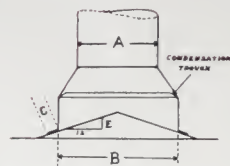
The principles of operation of the rectangular ventilators are in every respect the same as in the round ones, both taking advantage of the stack action of rising air currents inside the room and the wind velocities outside on the roof.

In schools, public buildings, and others of a like nature, where the rectangular duct that is to be capped with a rectangular ventilator empties by means of forced draft, dampers are sometimes not required. In these cases, the ventilators are furnished without the dampers at a reduction in cost.

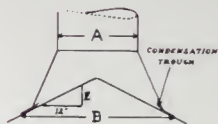
Rectangular ventilators are not manufactured in stock sizes because orders have called for such a wide variety that the plan of manufacturing for stock and shipping from stock could not be carried out. They are made up on order in any size desired. Work on them starts within one hour of the receipt of the order so almost the same service is obtained as if they were shipped from stock.

With the elaborate specifications for sizes and shapes of parts that Burt engineers have worked out, all that is needed from the client is the dimensions of the rectangular hole and the Burt production men can fit it. Galvanized iron is used throughout the body and galvanized bands, angles and channels for braces, except on the damper chain and pulley (if damper is used) which are made of rust resisting metal. If other metals are needed to resist the action of fumes, the ventilators can be made of the following metals which are carried in stock: Toncan Metal, Ingot Iron, Copper, Aluminum, Monel Metal, Keystone Copper Bearing Steel and Leadclad Sheets.

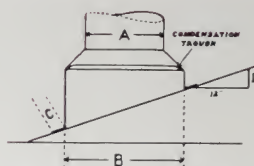
B U R T V E N T I L A T O R S



REGULAR SQUARE BASE-RIDGE



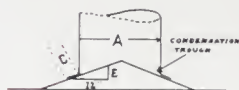
PYRAMIDICAL BASE-RIDGE



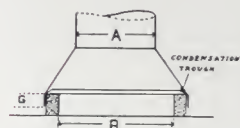
REGULAR SQUARE BASE-SLOPE



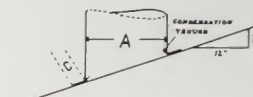
SQUARE BASE CURB CONSTRUCTION
TYPE "1" B DIM. OPTIONAL



REGULAR ROUND BASE-RIDGE



PYRAMIDICAL BASE CURB CONST
B DIM. OPTIONAL



REGULAR ROUND BASE-SLOPE



SQUARE BASE CURB CONST.
TYPE "2" B DIM. OPTIONAL

Legend:

- D Same as B or to any Dimension specified
- E Dimension required
- G State number of inches desired
- Z Always state thickness of curb

Round Bases—Dimensions A & B same

When ordering Bases always state type and pitch of roof and whether for slope or ridge

Extra Airshaft can be placed inside curb if desired

A	B	C	GA. IRON
8"	12"	4"	24
10"	14"	4"	24
12"	16"	4"	22
14"	18"	4"	22
16"	20"	4"	22
18"	23"	4"	20
20"	26"	5"	20
24"	30"	5"	20
30"	36"	5"	18
36"	42"	6"	18
40"	46"	6"	18
42"	48"	6"	18
48"	54"	6"	18
54"	60"	6"	18
60"	66"	6"	16
66"	72"	6"	16
72"	78"	6"	16

Features:

- 1—Condensation trough in every base.
- 2—Four inch flashing or more on every base to insure storm-proofness.
- 3—Four different types—"A Type for Every Condition."
- 4—Made separately for each particular job.

Burt Bases

BURT bases are made separately for each job to conform to the pitch of the roof on which they are to be used. They are rigidly constructed from the same heavy gauge of material as is used in the ventilators they are to support. Some ventilator manufacturers make the base of a material two gauges heavier than the ventilator itself. Often this in reality becomes a practice of making the ventilator two gauges lighter than the base, for reasons of economy. Even so, Burt bases will be found to be of heavier material than the ordinary base.

Four distinct types of Burt bases are made—first, the round base; second, the square base; third, the pyramidal base, and fourth, the special bases which are constructed for Federal or American Cement Tile Roofs. All Burt Bases have condensation gutters and are constructed with a very wide collar or flashing so as to insure a storm-proof job and at the same time present a large surface for anchoring the base to the roof. The round base is simply a cylindrical pipe of the same diameter as the ventilator ordered and cut to fit the particular roof on which it is to be installed.

The square base is built square to round. With the galvanized iron cut according to the design of Burt engineers, it gives great strength to support the ventilator and to resist the stresses of strong winds. The square base is by far the best for all types, particularly the Glass Top Sliding Sleeve Damper because it permits the maximum amount of light to enter the building at all times. The pyramidal base is also very good for certain installations.

Bases for any job are made up to order because of the varying pitches of roofs. Therefore, when ordering it is necessary to state whether they are for the slope or ridge of the roof and to give the pitch. All that is necessary is to tell how many inches the roof falls in a certain distance. For instance, merely state that your roof falls 6" in 12" or whatever the figures may be. If you have a curb construction, it is necessary to tell the inside and outside dimensions and the height of the curb. When a Federal

or American Cement tile roof is used, merely state that a base is wanted for a certain size of whichever type of roof is used. Other than size, they are all alike and can be fitted perfectly.

Ordinarily, it is necessary only to anchor or screw the base down through the roof flashing. However, many engineers and architects prefer to use other means. To meet their specifications we furnish band iron or angle iron to bolt into the ventilator base and fasten to an eye beam, angle iron, or other supporting member inside the building.

When curb construction is used, it is often desirable to put anchor bolts in the cement curb. If information as to the spacing of the bolts is sent with the order, Burt can put holes in the base accordingly.

The bases are generally made, like the ventilators, of prime open hearth galvanized steel sheets, but the following metals are carried in stock and can be used to meet any special conditions: Toncan Metal, Ingot Iron, Aluminum, Monel Metal, Keystone Copper Bearing Steel, Leadclad Sheets and Copper Sheets.

When the square base is used, the opening in the roof is considerably larger than the cross-section of the ventilator shaft. In other words, on bases for ventilators from 8" to 16" the square opening is 4" larger, on 18" bases the square opening is 5" larger, and in sizes above that the square opening is 6" larger. For example, if a 24" ventilator is ordered with 24" square base, the base will be 30" by 30" on the roof line and the connection with the ventilator shaft will be 24" in diameter. The square to round gives a compression of the air stream or nozzle action which makes for greater efficiency. See tables of dimensions for the details.

In some cases, where there is a lot of steam to be exhausted, it is best to use a special base that has been designed by Burt engineers. It has an air pocket or dead air space between the inside and outside walls to prevent condensation in the winter time.

Burt condensation gutters are built into all Burt bases to carry any moisture that might form, outside onto the roof.

Ventilation Data for Architects, Engineers and Builders

NATURALLY, the first question on ventilators that enters the mind of a man about to build a plant or remedy conditions in a plant already built, is how many ventilators should be used.

This depends upon the type of work to be done in the plant, as well as the number of employees, amount of machinery, etc., that will be in the plant at any given time. The number of ventilators in all but the abnormal conditions can be determined in a general way regardless of the size of the ventilator to be used.

First, the ventilators should be placed over any specific point where there is an urgent need for ventilation such as over a machine giving off fumes or over a mixer raising a great deal of dust. After these are taken care of, ventilators should be put on the building about 20 feet between centers and, if at all possible, on the highest points on the roof. Ventilators will have to give way to elevator shafts and skylights but the majority of them should be on the highest point to do their work efficiently. These rules hold good for buildings up to 50 feet in width. On wider buildings some ventilators will have to be placed on the ridge of the roof and some part way down the slope. At times it is advisable and necessary to stagger them on the roof.

The size of the ventilators can be determined next. The best way to handle this is to write to Burt and get the recommendations of a Burt engineer or to consult a competent engineer or architect. A sketch of the building with dimensions, the number of men to occupy the building, the type of work to be done, topographical location of the building and a description or sketch of surrounding higher buildings will give enough information for our engineers to work on as they have spent years in studying ventilator requirements.

Burt engineers are willing to give conservative tables of capacities so the proper number of ventilators can easily be figured. They are,

however, opposed to promiscuous publication of ventilator capacities, not because they are afraid of what Burt ventilators will do, but because figures might be misleading to the public. Burt has been a pioneer in maintaining this policy and other ventilator manufacturers are now realizing its value.

Ventilator capacities are controlled by so many variable factors that it is almost impossible for anyone but a ventilating engineer to arrive at an accurate figure, according to an opinion rendered by the Bureau of Standards at Washington, D. C., and backed up by those who have made a study of the subject.

This policy means that Burt is not trying to sell Burt ventilators on the strength of capacity tests under ideal conditions entirely unrelated to various requirements. Burt is, however, selling Burt ventilators on performance and guarantees them, size for size and type for type, to have an exhaustive capacity equal to or greater than any other ventilator on the market. As further proof of confidence, Burt engineers will gladly send a Burt ventilator of any size or type to responsible parties for test in comparison with any other make. Other reliable ventilator manufacturers will do the same.

If you should wish to compile conservative rough figures on the size of ventilators you will need, determine the number of cubic feet of air in the building; multiply this by the number of air changes required per hour and divide by the number of ventilators you have decided upon. This result will then be the number of cubic feet of air that you have to move every hour and you can then refer to this table of conservative capacities and find that your installation will require 24" or 30" or 36" ventilators, as the case may be.

FORMULA FOR FINDING SIZE OF VENTILATORS

The size of ventilators needed can be worked out on the following formula:

A TYPE FOR EVERY CONDITION

$$\frac{ab}{60c} = x$$

Where: a is the number of cubic feet of air in the room.

b is the number of air changes required per hour (see table).

c is the number of ventilators required as determined above.

x is the number of cubic feet of air to be exhausted per minute by each ventilator.

Referring the figure "x" to the table of capacities the approximate size of the ventilators needed can be found.

It is to be thoroughly understood in using this table of capacities that these figures would be comparable with those published by other ventilator manufacturers if one table had the same constants of wind velocity, temperature, etc., as the other. It is almost impossible to obtain the same constants throughout because of the many factors to be considered so Burt engineers, in publishing this table, have stated, "This table is not published to sell Burt ventilators, nor for comparative tests with other tables published, but simply to help architects to find the approximate size of ventilators needed."

In the advertisements to be found in Sweet's there are various tables of capacities. Some

have headings showing wind velocity and temperature difference; others tell the location of the ventilator or the humidity of the atmosphere, but in no case are all these variables given. Hence it is as difficult to compare the capacities of different ventilators as it is to say that apples taste better than peaches without mentioning certain definite varieties of both.

ANEMOMETER TESTS OF BURT VENTILATORS

Wind velocity 5 miles per hour, temperature difference 10 degrees.

Size	Cubic feet of air per minute		Rotary
	Sliding Sleeve Damper Ventilators	Hi-Efficiency Cone Damper Ventilators	
12 "	200	250	280
14 "	280	350	375
16 "	380	475	495
18 "	480	600	645
20 "	600	750	825
24 "	840	1050	1110
30 "	1280	1600	1700
36 "	2000	2500	2550
42 "	2640	3300	3450
48 "	3440	4300	4475
54 "	4320	5400	5600
60 "	5120	6400	6845
66 "	6240	7800	8300
72 "	7800	9750	9875

Dimensions, Weights and Gauges of Iron of Burt Stationary Type Ventilators

Diameter of Neck (Inches)	Gauge of Iron	Diameter of Outside Rim or Band (Inches)	Height of Glass Top without Base (Inches)	Height of Metal Top without Base (Inches)	Length of Neck from Bottom to Lower Rim of Wind Shield (Inches)	Net Weight Metal Top without Crating (Lbs.)	Net Weight Glass Top without Crating (Lbs.)	Area of Diameter in Square Inches
12	22	22	14	17	4 1/2	17	20	113.10
14	22	24	15	17 1/2	4 1/2	20	24	153.94
16	22	26	15 1/2	19	5	24	30	201.06
18	20	29	16	21	5	28	34	254.44
20	20	32	18	23	5 1/2	33	42	314.19
24	20	38	22	26	6	45	56	452.39
30	18	46	24	30	6	90	105	706.85
36	18	54	27	36	8	130	155	1,017.88
40	18	64	33	40	10	175	200	1,256.00
42	18	68	34	42	10	190	225	1,386.00
48	18	78	36	46	11	265	320	1,809.00
54	18	86	40	51	14	350	375	2,390.00
60	16	94	43	54	12 1/2	430	425	2,827.00
66	16	102	46	55	15 1/2	500	475	3,456.00
72	16	110	51	66	15 1/2	600	525	4,071.00

Ventilator bases are charged for extra.

Gauges given above are figured for Galvanized Iron, Toncan Metal, American Ingot Iron, Leadclad Sheets, and Keystone Copper.

Burt does not furnish any rope or chain for operating damper owing to the fact that the length would vary considerably. In ordering, be sure to specify whether metal or glass tops are desired.

At slight additional cost, the Burt ventilator can be equipped with bird screens.

GUARANTEE—Every Burt ventilator is guaranteed absolutely storm-proof; material and workmanship of the highest grade; operation of dampers to be positive so they will not stick or bind. Any ventilator proving unsatisfactory in any way will be repaired or replaced free of charge F. O. B. factory.

B U R T V E N T I L A T O R S

FRESH AIR REQUIREMENTS

The air conditions even in rooms of a similar nature and put to similar uses, vary so much that it is difficult to tabulate the number of air changes required per hour. For ordinary conditions, the following data furnished by the Heating & Ventilating Magazine can be used:

AIR CHANGES

The table below shows the changes of air per hour or the cubic feet per minute (CFM) per occupant, as recommended by the best authorities for various rooms of miscellaneous character as listed below:

Room	Exhaust CFM per Occupant	Minimum Air Changes per Hour
Assembly and Convention Halls	30	8
Boiler Rooms		10 to 12
Engine Rooms		8 to 10
Factories	20 to 30	4
Foundries		4
Halls and Assemblies	30	8
Mill Buildings	20 to 30	4
Offices (large)	20 to 30	

Private Offices (large)	6
Public Offices (large)	4 to 8
Public Offices (inside small)	6
Public Toilet Rooms	10
Public Waiting Rooms	4 to 6
Pump Rooms	8 to 10
Round Houses	12
Toilets	10
Waiting Rooms	4 to 6

For blacksmith shops and other places where severe fumes or dust or smoke are given off in the course of the work, the amount of air per person will be a great deal more. These abnormal conditions had best be taken up with our engineers but it is sufficient to say that in these cases the air vitiated by the fumes must be removed quickly and this can be done only by the installation of power driven fan equipment. Note particularly that regular type ventilators equipped with fans are far superior to the ordinary blower boxes sometimes placed on the roof or through a hole in the wall, because at the times when the severe fumes are not given off and the fan is stopped the ventilator action goes on as usual, giving the proper ventilation automatically and at no cost whatever.

Dimensions, Weights and Gauges of Iron of the Burt Ball Bearing Revolving Ventilator

Diameter of Neck (Inches)	Gauge of Iron	Height Over-all (Inches)	Width of Head (Inches)	Length of Head (Inches)	Net Weight (Lbs.)	Gross Weight (Lbs.)
10	22	17	13½	20	12	31
12	22	20½	17½	24	15	40
14	22	23½	18½	27½	19	45
16	22	24	23	33½	22	50
18	20	25	25½	35½	25	55
20	20	26	27	38½	35	63
24	20	29½	30½	43	42	70
30	18	33½	39	51	50	84
36	18	34½	46	58	85	170
40	18	41	49	63	135	230
42	18	43	51	65	172	278
48	18	49	57½	81½	190	329
54	18	58	63½	94	243	400
60	16	64	69	102	624	982
66	16	70	75	110	750	1,100
72	16	76	82	120	865	1,275

Ventilator bases are charged for extra.

Gauges given above are figured for Galvanized Iron, Toncan Metal, American Ingot Iron, Leadclad Sheets, and Keystone Copper. Other metals are figured on a different scale.

Burt does not furnish any rope or chain for operating damper owing to the fact that the length would vary considerably. At slight additional cost, the Burt ventilator can be equipped with bird screens.

GUARANTEE—Every Burt ventilator is guaranteed absolutely storm-proof; material and workmanship of the highest grade; operation of dampers to be positive so they will not stick or bind. Any ventilator proving unsatisfactory in any way will be replaced or repaired free of charge F. O. B. factory.

Suggested or Typical Specifications

In specifying Burt ventilators, architects and engineers can use the following for the various types in the Burt line. They have been found to be the most satisfactory for the architects, engineers, owners, roofing contractors, and for The Burt Manufacturing Company.

Specifications are given for each separate type of ventilator. The two paragraphs following, however, will be used in all specifications, regardless of type of ventilator:

- (a) Ventilator shall be guaranteed against defects in material and workmanship by the manufacturer, who shall agree to repair or replace without charge f. o. b. factory any ventilator so proving defective.
- (b) Ventilator shall be thoroughly flashed to the roof and be made absolutely water-tight. They shall positively not give any back drafts or allow rain or snow to enter the building.

METAL TOP VENTILATOR

- (1) Furnish and install on roof where shown in drawings, Burt Metal Top Ventilators as manufactured by The Burt Manufacturing Company, Akron, Ohio.
- (2) Ventilators shall be of diameters shown and shall be constructed of Open Hearth Galvanized Steel prime sheets (or any material you wish to specify) as per Burt Manufacturing Company's standard gauge strongly braced with galvanized bands and properly riveted.
- (3) Ventilators shall be provided with Sliding Sleeve Dampers operated by chains or cords over rust resisting pulleys and equipped with clips so that they can be set in any position and held permanently, without the necessity of tying to a post or other obstructions in the building. When sleeve is at its highest point it shall completely close the ventilator.

GLASS TOP VENTILATOR

- (1) Furnish and install in roof where shown on drawings, Burt Glass Top Ventilators as manufactured by The Burt Manufacturing Company, Akron, Ohio.
- (2) Ventilators shall be of diameters shown and shall be constructed of Open Hearth Galvanized Steel prime sheets (or any material you wish to specify) as per The Burt Manufacturing Company's standard gauge strongly braced with galvanized bands, and properly riveted.
- (3) Ventilators shall be provided with notched rims as manufactured by The Burt Manufacturing Company, Akron, Ohio, for holding the glass in place so that same can be replaced, if necessary, without undue trouble or without removing the ventilators from the roof.
- (4) Ventilators shall have trough or lips placed below the glass, so as to collect any condensation or moisture that might form on the glass.
- (5) The glass circles for the tops of the ventilators shall be of proper dimensions and shall be of one-quarter inch corrugated ribbed wire glass.
- (6) Ventilators shall be provided with Sliding Sleeve Dampers operated by chains or cords over rust resisting pulleys and equipped with clips so that they can be set in any position and held permanently, without the necessity of tying to a post or other obstructions in the building. When sleeve is at its highest point it shall completely close the ventilator.

WEAVE SHED VENTILATOR

- (1) Furnish and install ventilators for weaving rooms as shown on drawing, to be provided with double dampers, as manufactured by The Burt Manufacturing Company, Akron, Ohio.
- (2) Ventilators shall be of diameters shown and shall be constructed of Open Hearth Galvanized Steel prime sheets (or any material you wish to specify) as per Burt Manufacturing Company's standard gauge strongly braced with galvanized bands and properly riveted.

REVOLVING VENTILATOR

- (1) Furnish and install on the roof where shown in drawings, Burt Ball Bearing Revolving Ventilators as manu-

factured by The Burt Manufacturing Company, Akron, Ohio.

- (2) Ventilators shall be equipped with two sets of hardened steel ball bearings and shall have open back construction, so as to increase the capacity of the ventilator and hold same steady with the wind.

- (3) Ventilators shall be of diameters shown and shall be constructed of Open Hearth Galvanized Steel prime sheets (or any material you wish to specify) as per Burt Manufacturing Company's standard gauge strongly braced with galvanized bands and properly riveted.

CONE DAMPER VENTILATOR

- (1) Furnish and install on roof where shown on drawings, Burt Fire Retarding Cone Damper Ventilators as manufactured by the Burt Manufacturing Company, Akron, Ohio.
- (2) These ventilators to have the approval of the Underwriters' Association of America.
- (3) The damper to be of the inverted cone type and to be held in place with vertical damper guides, so that there is no bracing or obstruction of any kind in the air shafting itself.
- (4) Ventilator is to have an extra wide wind band as per Burt Manufacturing Company's standard for this type. Wind band to be located so as to prevent any entrance of outside wind into the ventilator head, whether up from a sloping roof or any other angle.
- (5) The cone dampers shall be operated by a cord or chain over rust resisting pulleys with fusible links which will cause dampers to drop and completely close in case of fire.
- (6) Ventilators shall be of diameters shown and shall be constructed of Open Hearth Galvanized Steel prime sheets (or any material you wish to specify) as per Burt Manufacturing Company's standard gauge strongly braced with galvanized bands and properly riveted.

FAN VENTILATOR

Direct connected fan ventilators will use these two paragraphs and paragraphs 3, 4, 5 and 6 below.

- (1) Furnish and install as shown on drawings Burt Direct Connected Fan Ventilators provided with four blade fan mechanism which is directly connected to the motor itself eliminating all belts, idlers, and pulleys.
- (2) Fans shall have large inspection doors to permit easy access to the motors for oiling purposes. Motors to be of the vertical type with ball bearings for thrust and radial bearings, correctly packed to insure three months' run without lubrication.

Belt driven fan ventilators will use this paragraph and paragraphs 3, 4, 5 and 6 below.

- (1) Furnish and install as shown on drawings Burt Fan Ventilators provided with six blade fan mechanisms, which can be operated by belt from line shafting or belt from motor.

The following paragraphs will be used with all types of fan ventilators:

- (3) Ventilators shall be of diameters shown and shall be constructed of Open Hearth Galvanized Steel prime sheets (or any material you wish to specify) as per Burt Manufacturing Company's standard gauge strongly braced with galvanized bands and properly riveted.
- (4) Ventilators shall be guaranteed against defects in material and workmanship by the manufacturers, who shall agree to repair or replace without charge f. o. b. factory any ventilator so proving defective.
- (5) Ventilators shall be thoroughly flashed to the roof and be made absolutely water-tight. They shall positively not give any back drafts or allow rain or snow to enter the building.
- (6) Fan ventilators are to be provided with cone dampers operated by cord or chain from rust resisting pulleys with fusible links which will cause dampers to drop and completely close in case of fire.

Burt Oil Filters and Exhaust Heads

The Burt Manufacturing Company began business in 1891 as makers of oil filters, pioneers in the line. Since that time the output has increased rapidly until now Burt is the oldest and largest manufacturer of oil filters in the world, supplying the entire United States and 29 foreign countries. Thirteen governments have used them.



Since the founding of the Burt Manufacturing Company, exhaust heads and ventilators have been added to the line.

OIL FILTERS

Every user of lubricating oil knows that the larger portion of the oil he buys is not consumed by the machinery on which it is used, but passes through the bearings, drips away

and is lost, except in cases where special provision has been made for gathering the waste oil by means of drip pans or buckets. This waste oil frequently amounts to from 50% to 90% of the entire quantity used. As the lubricating properties of oil are not affected in the least by use on bearings and subsequent filtering, the cost of an oil filter is an investment that pays very large dividends.

Burt engineers suggest that anyone not using oil filters, instruct their engineers to collect the waste for a month or two and store it in a barrel. That is the only way in which a definite check can be made on oil waste and the results of such a check will show definitely the need for an oil filter.

EXHAUST HEADS

Burt exhaust heads will save money and prevent oil and wet steam from escaping

through the exhaust pipe to the roof, walls of buildings or to sidewalks or property of other people. Their use prevents drenching and disfigurement of the building and rotting of roofs. Furthermore, their use saves the water employed in the steam system, as the same water (after the cylinder oil has been removed) is used again, with the advantage that the water returning from the exhaust head is distilled and is absolutely pure.

These exhaust heads are constructed of heavy sheet steel, giving a large inside area and providing abundant room for the expansion of steam. With plenty of room for expansion, there is no back pressure; and as the area of the steam chamber is not lessened by useless stuffing, it is virtually increased. Extra heavy steel plate is used throughout. No stronger construction is possible.



THIRTY DAY TRIAL

Burt offers to send one or more of its Oil Filters or Exhaust Heads to any responsible house on 30 days' trial, subject to approval in every respect. If it is found upon trial that the Burt Oil Filters do not reduce lubricating bills by at least 50% or that Burt Oil Filters or Exhaust Heads fail to meet every claim which Burt makes for them they

may be returned and Burt will pay the freight charges both ways. This trial is free from expense in every way so anyone who desires to test Burt goods runs no risk in accepting this proposition.



